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Farm Input Price Changes and their Impact on Households Welfare in Nigeria: A Review

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Abstract
Despite the central role of Agriculture to Nigeria's socioeconomic stability, contributing significantly to employment, food production, and rural livelihood, yet persistent volatility in farm input prices particularly fertilizers, seeds, agrochemicals, fuel, and labour poses a major threat to agricultural productivity and household welfare. This review systematically synthesizes conceptual, theoretical, and empirical literature on farm inputs price dynamics and their implications for household welfare in Nigeria between 2000 and 2024. The study integrates evidence from fifty-two (52) national and international publications to assess how input cost fluctuations affect productivity, and farmers household's overall welfare. Findings revealed that rising input prices reduce input utilization, lower yields, and elevate food prices, thereby eroding real household income and welfare. Fertilizer price shocks emerge as the most influential determinant of welfare loss, while energy and fuel price hikes further exacerbate production and consumption costs. While coping mechanisms such as reduced input use, crop diversification, informal credit reliance, and non-farm income diversification offer temporal relief. Gender, regional, and income disparities compound the welfare impact, with smallholder and female-headed households being most vulnerable. Also, policy responses including fertilizer subsidy schemes, credit programs, and market reforms have achieved limited success due to inefficiencies, inadequate coverage, and macroeconomic instability. The review identifies key research gaps related to price transmission, gendered welfare analysis, and integration of climatic variables in welfare modeling. It concludes that stabilizing agricultural input markets, improving credit access, and strengthening institutional capacity are essential to mitigate welfare losses and foster inclusive agricultural growth in Nigeria.

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1. Introduction

Agriculture plays a vital role in Nigeria's socioeconomic development, serving as a major source of employment, food, and income for a significant proportion of the population. The sector contributes about 25–30% of the country's Gross Domestic Product (GDP) and supports over 60% of rural households (National Bureau of Statistics (NBS), 2023) [32, 33]. Agricultural performance in Nigeria, however, is heavily dependent on the availability, affordability, and efficient use of farm inputs such as fertilizer, improved seeds, agrochemicals, machinery, and labor. These inputs are key determinants of productivity and, consequently, of household welfare (Ogunniyi *et al*., 2020; Oluwatayo and Ojo, 2021) [39, 41].

In recent years, Nigeria has experienced significant volatility in the prices of essential agricultural inputs. Factors such as exchange rate depreciation, inflationary pressures, global supply chain disruptions, and the withdrawal of government subsidies among others have contributed to persistent input price increases (Central Bank of Nigeria (CBN), 2023; World Bank, 2023) [11, 52]. The cost of fertilizer, for instance, rose by more than 200% between 2016 and 2023 (Food & Agricultural Organization (FAO), 2022) [18], while prices of improved seeds, herbicides, and fuel used for farm operations have also surged. These escalating costs have created widespread concerns about their effects on farmers' production decisions, profitability, and household well-being (Ayinde, Ajewole, and Adewuyi, 2019) [9].

Furthermore, the welfare implications of rising input prices are multifaceted. On one hand, farmers face higher production costs, which may greatly bring about input use reduction, leading to lower productivity and income (Ogunniyi *et al*., 2020) [39]. On the other hand, consumers experience higher food prices as producers pass on increased costs, thus eroding purchasing power and household welfare (Ivanic and Martin, 2008) [24]. In rural areas where households are both producers and consumers of agricultural goods, the dual effect of reduced farm income and increased food expenditure exacerbates poverty and food insecurity (Adeniyi and Aremu, 2021) [2].

Several studies have highlighted the link between agricultural input prices and household welfare. For instance, Oluwatayo and Ojo (2021) found that input price shocks significantly reduced welfare levels among smallholder farmers in southwestern Nigeria [41]. Similarly, FAO (2022) noted that over 45% of farmers in Nigeria reduced fertilizer application due to price hikes, leading to decreased yields and worsening food security [18]. However, despite the growing body of literature, few studies have comprehensively synthesized how farm input price changes influence household welfare in Nigeria across different socioeconomic contexts.

The research gap thus lies in the limited integration of both price dynamics and multidimensional welfare indicators including consumption, income, and access to basic needs within the same analytical framework. Moreover, existing studies often focus on microeconomic or macroeconomic aspects in isolation, without linking market-level price fluctuations to household-level welfare outcomes. This review therefore aims to bridge these gaps by systematically analyzing existing evidence on farm input price changes and their impacts on household welfare in Nigeria.

By consolidating theoretical, conceptual, and empirical insights, this paper seeks to provide a comprehensive understanding of how rising input prices shape welfare outcomes, and to offer policy directions for stabilizing agricultural input markets while safeguarding household well-being.

2. Literature Review

2.1. Conceptual Review

2.1.1. Farm Inputs and Price Changes

Farm inputs are the physical and financial resources used in the production of agricultural goods. They include land, labor, capital, fertilizer, seeds, agrochemicals, water, and machinery (FAO, 2022) [18]. The efficiency with which these inputs are combined determines agricultural productivity and profitability. According to Ogunniyi *et al*., (2020) [39], the availability and affordability of quality inputs such as fertilizer and improved seeds play a crucial role in enhancing farm output and rural welfare. Conversely, when input prices rise, farmers often reduce their use of critical inputs, leading to lower yields and decreased income (Oluwatayo and Ojo, 2021) [41].

In Nigeria, the input market is characterized by high import dependence, weak distribution networks, and policy inconsistencies. Fertilizer, for example, remains largely imported or produced at high cost due to energy constraints and foreign exchange instability (CBN, 2023) [11]. Similarly, improved seed varieties are not readily available to all farmers, and when they are, high costs restrict adoption (Ayinde *et al*., 2019) [9]. These structural challenges make Nigerian farmers highly vulnerable to input price fluctuations, thereby increasing the risk of declining productivity and welfare outcomes.

Price changes refer to the variation in the market price of goods or services over time due to shifts in supply and demand, production costs, or macroeconomic conditions (World Bank, 2023) [52]. In the agricultural sector, price changes in farm inputs are influenced by factors such as inflation, exchange rate movements, subsidy removal, and international commodity prices (Adeniyi and Aremu, 2021) [2]. For instance, when global fertilizer prices increase, import-dependent countries like Nigeria experience higher local input costs, which subsequently affect production decisions and output prices.

The transmission of price changes from input to output markets is central to understanding welfare implications. Rising input costs can lead to higher food prices, reducing consumer purchasing power. This phenomenon is particularly detrimental in developing economies, where food constitutes a large share of household expenditure (Ivanic and Martin, 2008) [24]. As prices of essential inputs increase, smallholder farmers who lack access to credit or savings are disproportionately affected, resulting in welfare losses and, in extreme cases, increased poverty levels (FAO, 2022) [18].

2.1.2. Household Welfare

Household welfare is a broad concept that encompasses economic, social, and physical well-being. It is often measured through indicators such as income, consumption expenditure, asset ownership, access to health and education, and overall living standards (NBS, 2023) [32, 33]. In the context of agricultural households, welfare is closely tied to farm productivity, market prices, and access to inputs (Ogunniyi *et al*., 2020) [39].

According to Oluwatayo and Ojo (2021) [41], welfare can be categorized into direct and indirect effects of agricultural performance. Directly, increased productivity leads to higher incomes, improved food availability, and better living conditions. Indirectly, agricultural growth stimulates non-farm employment and rural infrastructure development, further enhancing welfare. However, when input prices rise sharply, these positive effects may be reversed. Households may experience reduced consumption, limited access to healthcare and education, and heightened food insecurity (Adeniyi and Aremu, 2021) [2].

Welfare analysis also draws on the concept of consumer and producer surplus, where price changes can cause welfare gains or losses depending on whether households are net producers or consumers of agricultural commodities (Ivanic and Martin, 2008) [24]. In Nigeria, most smallholder

households are net food consumers, meaning that input price increases leading to food price inflation tend to reduce their real welfare levels. Therefore, policies aimed at stabilizing input prices and improving input access are essential for sustaining household welfare in the face of economic shocks.

2.2. Theoretical Review

2.2.1. Agricultural Household Model

The Agricultural Household Model (AHM), developed by Singh, Squire, and Strauss (1986) [48], provides a comprehensive framework for analyzing rural households that simultaneously act as producers and consumers. The model integrates production and consumption decisions within the same household, recognizing that farm households allocate resources not only to maximize profit but also to achieve utility from consumption.

In Nigeria, the relevance of this model could be induced from the dependence most rural households on agricultural production for both income and food consumption. Changes in farm input prices directly affect production costs and output decisions, while indirectly influencing household consumption and welfare. For instance, when fertilizer or seed prices increase, farmers may reduce the quantity of inputs used, leading to lower yields and income. Consequently, their consumption expenditure and welfare decline (Ogunniyi *et al*., 2020) [39].

Empirical applications of the AHM in developing economies (de Janvry, Fafchamps, and Sadoulet, 1991) [12] show that the welfare effects of price changes depend on whether a household is a net producer or net consumer of agricultural goods. However, in Nigeria, where many smallholders are net consumers of food, increases in input prices that push up food prices often lead to welfare losses (Adeniyi and Aremu, 2021) [2].

2.2.2. Consumer and Producer Theory

Consumer and Producer Theory, rooted in microeconomic analysis, explains how households respond to price changes through substitution and income effects. According to Nicholson and Snyder (2017) [34], when the price of a commodity or input increases, rational agents adjust their consumption or production decisions to maximize utility or profit given their constraints.

From the producer perspective, rising input prices increase marginal costs, potentially reducing supply if output prices do not rise proportionally. From the consumer side, higher food prices caused by rising input costs reduce real income and purchasing power, leading to welfare losses (Ivanic and Martin, 2008) [24].

This theoretical framework underscores the dual nature of Nigerian households many being both producers and consumers. Therefore, input price volatility influences welfare both directly through production costs and indirectly through food price inflation. The magnitude of welfare change depends on the elasticity of demand and supply for inputs and outputs (Ayinde *et al*., 2019) [9].

2.2.3. Welfare Economics Theory

Welfare economics provides the normative basis for assessing how price changes affect social welfare. As shown in the works of Pigou (1932) [45] and later Pareto, the theory posits that welfare improves when resource allocation increases overall utility without making anyone worse off (Pareto efficiency). However, in real-world markets especially in developing economies price shocks and market imperfections often lead to welfare losses for certain groups, particularly the poor (Todaro and Smith, 2020) [50].

Applying welfare economics to the Nigerian agricultural peculiarity suggests that input price increases generate negative externalities for smallholder farmers who lack resilience to cost shocks. Policy interventions, such as subsidies and price stabilization mechanisms, can therefore enhance welfare by correcting market failures (FAO, 2022) [18].

Thus, this theory emphasizes that welfare outcomes should be evaluated not only in terms of aggregate income but also distributional equity, access to resources, and social protection mechanisms.

2.2.4. Price Transmission and Market Integration Theory

Price transmission theory explains how changes in one market (input markets) are transmitted to other related markets (output or consumer markets). According to Meyer and von Cramon-Taubadel (2004) [30], efficient price transmission ensures that market signals are passed along the value chain, influencing production and consumption decisions.

In Nigeria, weak market integration due to infrastructural deficits, monopolistic intermediaries, and policy distortions often result in asymmetric price transmission (Ogunniyi *et al*., 2020) [39]. This implies that input price increases are quickly transmitted to output prices, raising food costs, while price reductions are slow to reach consumers. Consequently, welfare losses are more pronounced during inflationary periods than the gains realized during price stabilization (World Bank, 2023) [52].

The theory therefore supports the need for well-functioning agricultural markets to mitigate welfare fluctuations caused by input price instability.

or expenditure, overlooking multidimensional indicators such as health, education, and resilience. These gaps highlight the need for a review of an integrated and longitudinal

3. Methodology

3.1. Review Method

This review adopts a systematic scoping approach designed to comprehensively identify, appraise, and synthesize empirical and conceptual literature published on farm input price changes and their impact on household welfare between 2000-2024 with emphasis on Nigeria and comparable low- and middle-income country contexts.

3.2. Search Strategy and Strings

Searches were conducted across multiple academic databases such as Scopus, Web of Science, JSTOR, Google Scholar and other sources. Search strategies were developed iteratively with synonyms and Boolean operators to balance sensitivity and specificity. Searches combine terms for “inputs”, “prices”, “price change”, “price shock”, “price volatility”, “household welfare”, “consumption”, “income”, “food insecurity”, “living standard”, “wellbeing”, Nigeria, “West Africa”, “Sub-Saharan Africa”, and “Pub Year > 1999”.

3.3. Inclusion and exclusion criteria

A total of fifty-two (52) peer-reviewed articles from national, regional, and household-level data covering quantitative, qualitative and mixed methods which explicitly examine

farm input price changes and report outcomes related to household welfare published in English between 2000 – 2024 were included. Whereas, studies that only examine crop output prices without reference to input prices or household welfare opinion pieces without empirical evidence or theoretical development pertaining to input prices and welfare as well as studies restricted to high-income country contexts where the production/consumption patterns are not comparable to Nigeria were all excluded.

3.4. Screening and selection process

Screening occurred in three stages:

1. **Deduplication:** All retrieved records were imported into Endnote reference management software and deduplicated.
2. **Title/abstract screening:** Two independent reviewers screened titles and abstracts against inclusion criteria.
3. **Full-text screening:** Full texts of potentially eligible studies were obtained and reviewed against the inclusion/exclusion criteria.

3.5. Data synthesis approach: Narrative and thematic synthesis

Due to the heterogeneity of included articles, the primary synthesis was structured narrative and thematic using the following steps:

1. **Grouping by theme:** studies were grouped by input type (fertilizer, seed, fuel, labour), welfare outcome (income/consumption, poverty, food security), geographic focus (Nigeria vs. other SSA countries), and methodological approach (cross-sectional, panel, time-series).
2. **Within-group synthesis:** summarized direction and magnitude of effects, methodological strengths/weaknesses, and policy context.
3. **Cross-group synthesis:** studies were integrated to identify common patterns, contradictions, and conditional relationships.
4. **Visual displays:** tables summarizing key study findings and attributes.

This method follows guidance by Popay *et al*., (2006) [46] and is appropriate where meta-analysis is impractical.

4. Results & Discussion

The review synthesizes findings on how farm input price changes affect household welfare. Evidences are organized around nine themes namely: (1) fertilizer price shocks & welfare outcomes; (2) input price volatility and agricultural productivity; (3) farm input costs and food security outcomes; (4) energy/fuel price increases and food security; (5) coping and adaptation strategies of rural households; (6) labour and wage dynamics; (7) role of subsidies and market interventions; (8) distributional effects (gender, income groups, and regions) as well as (9) policy and market responses to input price shocks.

4.1. Fertilizer Price Shocks and Welfare Outcomes

Fertilizer price volatility is among the most intensively studied input-price phenomena given fertilizer's central role in yield enhancement for staple crops. Across studies in Nigeria and comparable contexts in sub-Saharan Africa, rising fertilizer prices are consistently associated with reduced input use, lower yields, and deteriorating household welfare.

Empirical studies using household survey and market price data show that higher fertilizer prices lead farmers to reduce application rates or switch to less input-intensive crops, producing negative short-run effects on output and income (Ogunniyi *et al*., 2020; Oluwatayo & Ojo, 2021) [39, 41]. For instance, panel analyses drawing on LSMS-type datasets indicate that a sustained increase in real fertilizer price is correlated with declines in per-capita food consumption and higher probability of falling below national poverty thresholds (Adeniyi & Aremu, 2021; Ojo *et al*., 2022) [2, 40]. Farmer interviews thus report cutbacks in fertilizer use as a primary coping strategy during price spikes (FAO, 2023) [17].

4.2. Input Price Volatility and Agricultural Productivity

Several empirical studies have established a strong connection between rising farm input prices and declining agricultural productivity. High fertilizer and seed costs often reduce farmers' input utilization rates, resulting in lower yields and farm income (Liverpool-Tasie *et al*., 2021; Ogundari & Awokuse, 2018) [27, 37]. For instance, Liverpool-Tasie *et al*., (2021) [27] used household panel data from northern Nigeria and found that a 10% increase in fertilizer prices reduced smallholder maize yields by approximately 4%, primarily due to reduced input intensity. Similarly, Ogundari and Awokuse (2018) [37] found that the elasticity of agricultural output to fertilizer price in sub-Saharan Africa is negative and significant, implying that fertilizer affordability remains a major determinant of productivity. Evidence from international studies corroborates these findings. Mason and Jayne (2017) [29], in their multi-country study across Zambia, Kenya, and Malawi, confirmed that fertilizer price volatility is inversely related to maize productivity and household income. In Nigeria, Oyinbo *et al*., (2020) [43] demonstrated that increased fertilizer prices during the 2016–2017 economic recession significantly depressed agricultural GDP growth and widened rural income inequality. The consensus across these studies is that persistent input price instability directly undermines farmers' capacity to sustain production levels, thereby threatening the welfare of rural households dependent on agriculture.

4.3. Farm Input Costs and Food Security Outcomes

Empirical literature consistently links input price surges to food insecurity and household welfare losses. When input costs rise, farmgate prices of staples also increase, reducing consumer access to affordable food. For example, Adepoju and Oyakhilomen (2022) [3] found that rising fertilizer and transport costs explained nearly 30% of food price inflation between 2018 and 2021 in Nigeria. Similarly, Ayanlade *et al*. (2020) [8], using data from the Nigeria Living Standards Survey, observed that input price hikes led to a reduced per capita food consumption, especially among low-income farming households.

At the household level, Babatunde *et al*., (2019) [10] estimated that a 15% increase in fertilizer prices translated into a 5% decline in household caloric intake in rural Kwara State, due to both reduced production and higher market food prices. These findings align with FAO (2021) [16] observations that global fertilizer price increases between 2020 and 2022 disproportionately affected smallholder farmers in Africa, leading to reduced input use and worsening food insecurity.

Thus, the literature underscores that rising input prices not only reduce productivity but also directly constrain household welfare and nutritional security.

4.4. Energy and Fuel Price Increases: Transmission to Food Prices and Household Welfare

Fuel and energy prices affect agriculture both directly through (farm mechanization, irrigation, transport of inputs and output) and indirectly due to (fertilizer production costs & market operating costs). Empirical research demonstrates that rising fuel prices increase the overall cost of production and distribution, with effects on consumer food prices and household welfare.

In Nigeria, econometric studies by Ayinde *et al*., (2019) [9] that link monthly market price series with household consumption data find significant pass-through from fuel price increases to staple food prices. Similarly, a Time-series and vector autoregression (VAR) analyses at the national level by World Bank, (2023) [52] show that fuel shocks produce persistent increases in food inflation which disproportionately affect low-income households. Methodological strengths in this study include the use of high-frequency market price data and structural VARs to identify short-run dynamics. However, attribution challenges remain: fuel price shocks often coincide with exchange-rate movements, seasonal shocks, or policy reforms, which complicates identification. Household-level evidence also indicates reduced real consumption expenditure during episodes of elevated fuel costs, especially where households rely on market purchases rather than own production (Ivanic & Martin, 2008) [24].

4.5. Coping and Adaptation Strategies of Rural Households

Faced with input price fluctuations, smallholder farmers in Nigeria often adopt diverse coping mechanisms. Adetayo and Omotesho (2021) [4] found that households respond to fertilizer price hikes by reducing cultivated land area, adopting organic manure, or switching to low-input crops such as cassava and yam. Similarly, Ezeh *et al*., (2020) [14] observed that some farmers resort to informal credit networks or cooperative societies to access subsidized inputs, though such mechanisms are limited in reach and sustainability.

Ibrahim and Omonona (2022) [23], analyzing rural households in Kaduna State, reported that diversification into non-farm income activities such as petty trading or artisanal work was a key resilience strategy against input price volatility. However, they also found that such strategies provide only short-term relief and do not substitute for structural input market reforms. At the national level, NBS (2023) [32, 33] data show that 57% of rural households reduced fertilizer use in 2022 due to affordability constraints, further emphasizing the widespread nature of input price stress.

4.6. Labour and Wage Dynamics: Effects on Household Welfare

Labour is a dual factor for farm households a production input and a key source of income when household members engage in off-farm employment. Studies on labour cost dynamics consider both hired labour wages and opportunity costs of family labour.

Empirical evidence suggests that rising wages for hired labour raise farm costs and can lower net farm income if output prices do not adjust upward. However, higher rural wages may also reflect increased non-farm employment opportunities, potentially augmenting household income and welfare through diversification (Dercon & Krishnan, 2000) [13]. In Nigeria, micro-level studies indicate mixed effects: in contexts where households are net employers of labour (larger farms), rising labour costs reduce profitability, whereas in contexts where households derive income from labour provision, rising wages can improve welfare (Ogunniyi *et al*., 2020) [39].

4.7. Role of Subsidies, Credit, and Market Interventions

Policy interventions notably fertilizer subsidies, targeted credit programs, and input distribution platforms are central to mitigating welfare losses from input price volatility. A number of quasi-experimental studies exploit policy rollouts or program targeting to estimate impacts. Recent evaluations of Nigeria's subsidy and support programs (such as Growth Enhancement Support, Anchor Borrowers Programme) report mixed evidence. Some studies find that targeted input support increased fertilizer use and yields among beneficiaries, with positive effects on consumption and food security (Jayne & Rashid, 2013; FAO, 2022) [25, 18]. Other evaluations highlight leakage, mistargeting, and limited scale, reducing program effectiveness (Oluwatayo & Ojo, 2021) [41] leading to a cobra effect.

Credit access emerges as a significant moderating factor. Households with access to affordable credit are better able to smooth input purchases during price spikes and maintain input-intensive farming practices; empirical estimates show credit access attenuates the negative welfare impacts of input price increases (Adeniyi & Aremu, 2021) [2]. However, analyses also show that formal credit penetration remains low among smallholders and that high interest rates limit the welfare benefits of credit where it is available.

4.8. Distributional Effects: Gender, Income Groups, and Regional Differences

A recurring finding across various literature showed welfare impacts of input price changes are highly heterogeneous across household types. Poorer households, female-headed households, and those in more remote regions tend to bear larger welfare losses.

Gendered analyses reveal that female-headed households who often have less access to credit, extension services, and land are more vulnerable to input price hikes (Akinbode *et al*., 2022) [6]. Likewise, income and farm-size stratification showed that smallholders and net food-consuming households experience larger adverse welfare impacts because they have limited capacity to absorb higher costs or to pass them onto consumers (Ivanic & Martin, 2008; Adeniyi & Aremu, 2021) [24, 2]. Regional analyses within Nigeria demonstrate that the North, where yields are lower and market access limited, is more vulnerable to price shocks than the South, though the South may experience stronger pass-through into consumer prices due to urban demand (Ogunniyi *et al*., 2020) [39].

Table 1: Farm Input Price Changes and Household Welfare

Author(s) & Year	Country / Region	Data Source & Type	Analytical Method(s)	Key Findings / Major Conclusions
Liverpool-Tasie, Kuku-Shittu, & Ajibola (2021) [28]	Nigeria	Panel household data (2010–2018) from northern Nigeria	Fixed effects regression	A 10% rise in fertilizer prices reduces maize yield by ~4%; input affordability crucial for productivity.
Ogundari & Awokuse (2018) [37]	Sub-Saharan Africa	Meta-analysis of 56 studies (1990–2017)	Meta-regression	Fertilizer price elasticity of agricultural output is negative and significant; input affordability drives output.
Mason & Jayne (2017) [29]	Zambia, Kenya, Malawi	National-level time series data	Panel regression	Fertilizer price volatility significantly reduces maize productivity and smallholder incomes.
Oyinbo, Udeh, & Bolarin (2020) [44]	Nigeria	Macro time series (1999–2018)	ARDL model	Fertilizer and fuel price hikes during the 2016–2017 recession reduced agricultural GDP and increased inequality.
Adepoju & Oyakhilomen (2022) [3]	Nigeria	Time series (1981–2020)	ARDL bounds testing	Fertilizer and transport costs explain ~30% of Nigeria's food price inflation; input costs influence household welfare.
Ayanlade, Radeny, & Morton (2020) [8]	Nigeria	Nigeria Living Standards Survey (2018)	Probit and Tobit models	Input price shocks lower per capita food consumption; poor households most vulnerable.
Babatunde, Olagunju, & Adenuga (2019) [10]	Nigeria (Kwara State)	Primary household survey (2017)	OLS and consumption model	15% fertilizer price rise leads to 5% reduction in household caloric intake; welfare deteriorates under price shocks.
Adetayo & Omotesho (2021) [4]	Nigeria (North Central)	Cross-sectional data	Descriptive statistics and logistic regression	Farmers cope with input price hikes by reducing cultivated area, using manure, or switching to low-input crops.
Ezeh, Agwu, & Nwankwo (2020) [14]	Nigeria	Primary household survey (2018)	Ordered probit model	Access to cooperative credit mitigates welfare loss from rising input costs; informal finance remains crucial.
Ibrahim & Omonona (2022) [23]	Nigeria (Kaduna State)	Household-level data (2020)	Logit and multinomial regression	Non-farm diversification and cooperative membership improve resilience to input price volatility.
Abdullahi *et al*., (2021) [1]	Nigeria	Anchor Borrowers' Programme survey data	Propensity score matching (PSM)	ABP participation increases yields and income, but limited coverage restricts nationwide welfare impact.
Takeshima & Liverpool-Tasie (2015) [49]	Nigeria	Policy evaluation dataset	Descriptive and institutional analysis	Fertilizer subsidy reforms improved access marginally; inefficiencies and corruption limited program effectiveness.
Nkang, Udoh, & Essien (2020) [36]	Nigeria	Macro-level data (1985–2019)	Vector autoregressive (VAR) model	Exchange rate depreciation and inflation are key determinants of rising input prices in Nigeria.
FAO (2021) [16]	Global (including Africa)	Secondary global database	Comparative analysis	Fertilizer price surges (2020–2022) worsened food insecurity and reduced smallholder input use across Africa.

Table 2: Policy Responses to Farm Input Price Changes and Their Effectiveness in Nigeria

Policy Programme	Period Initiator	Core Objective	Key Components	Empirical Evidence on Effectiveness	Major Limitations	References
National Fertilizer Subsidy Scheme	1976 – 2011 (Federal Government of Nigeria)	Reduce fertilizer costs and improve farmer access.	Government importation and distribution of subsidized fertilizers through ADPs and state governments.	Increased fertilizer uses in some years, but little sustained productivity growth (Takeshima & Liverpool-Tasie, 2015) [49].	High leakage rates, elite capture, late delivery, poor targeting, and corruption.	Takeshima & Liverpool-Tasie (2015) [49]; Ogundari & Awokuse (2018) [37].
Growth Enhancement Support Scheme (GESS)	2012 – 2016 (Federal Ministry of Agriculture)	Modernize input delivery using mobile technology (e-wallet).	Electronic voucher system for subsidized fertilizer and seeds; private input dealer participation.	Improved transparency and private-sector participation; modest yield increase among beneficiaries (Liverpool-Tasie *et al*., 2021) [28].	Limited network coverage, delayed voucher redemption, and weak monitoring.	Liverpool-Tasie *et al*., (2021) [28]; Oyinbo *et al*., (2020) [44].
Anchor Borrowers' Programme (ABP)	2015 – present (Central Bank of Nigeria)	Provide credit and inputs to smallholders via value-chain linkages.	Input financing, extension support, and guaranteed offtake by processors.	Participants recorded higher yields and income (Abdullahi *et al*., 2021) [1].	Limited reach, repayment default, bureaucratic delays, and political interference.	Abdullahi *et al*. (2021) [1]; Ibrahim & Omonona (2022) [23].
Presidential Fertilizer Initiative (PFI)	2017 – present (Federal Government /	Encourage local fertilizer blending and	Partnership with Nigerian Sovereign Investment	Fertilizer price stabilized temporarily (2018–2020); increased	Currency depreciation, high logistics cost, and	Nkang *et al*., (2020) [36]; FAO (2021) [16].

	NSIA / Morocco)	reduce import dependence.	Authority and OCP Morocco; local blending plants.	domestic production capacity (Nkang *et al*., 2020) [36].	supply-chain inefficiencies limit sustainability.	
Agricultural Credit Guarantee Scheme Fund (ACGSF)	1977 – present (Central Bank of Nigeria)	Encourage banks to lend to agriculture via loan guarantees.	Credit guarantee up to 75% of loan value for approved projects.	Improved access to credit for medium-scale farmers; minimal effect for smallholders due to collateral constraints (Ezeh *et al*., 2020) [14].	Low awareness, administrative bottlenecks, and urban bias in credit allocation.	Ezeh *et al*., (2020) [14]; Ibrahim & Omonona (2022) [23].
Fertilizer Quality Control Act and National Fertilizer Quality Control Laboratory	2019 – present (Federal Government / NAFDAC)	Ensure quality and prevent adulteration of fertilizers.	Quality monitoring, inspection, and certification mechanisms.	Still nascent; potential to improve farmer confidence in local inputs (FAO 2021) [16].	Enforcement capacity and funding constraints.	FAO (2021) [16].
Private Sector Input Market Liberalization	Post-2017 (Market-driven reform)	Promote competition and reduce government dominance.	Deregulation of fertilizer imports, blending, and sales.	Encouraged new entrants and local investment; price remains volatile due to exchange-rate pressures (Nkang *et al*., 2020) [36].	Weak market regulation and poor infrastructure.	Nkang *et al*., (2020) [36]; Adepoju & Oyakhilomen (2022) [3].

Note: ADP = Agricultural Development Programme; NSIA = Nigeria Sovereign Investment Authority; NAFDAC = National Agency for Food and Drug Administration and Control

Table 3: Identified Research Gaps and Suggested Directions for Future Studies

Thematic Area	Identified Gap	Justification	Suggested Future Research Direction	Relevant Sources
Price Transmission and Volatility	Limited empirical evidence on input price shocks (fertilizer, seed, feed, fuel) transmission to rural household welfare indicators (income, food expenditure, nutrition).	Most studies focus on farm output prices rather than input-side shocks.	Use of time-series and panel econometric models (ARDL, VAR, or CGE models) to trace input price volatility and welfare transmission pathways.	Takeshima & Liverpool-Tasie (2015) [49]; Oyinbo *et al*., (2020) [44].
Micro-level Welfare Analysis	Insufficient micro-level analysis linking input price changes to specific welfare outcomes (poverty incidence, consumption, and livelihood diversification).	Household-level data from NLSS and LSMS-ISA are underutilized in price–welfare studies.	Use of nationally representative micro-data to estimate marginal welfare effects of input price variations across income quintiles and regions.	Ogundari & Awokuse (2018) [37]; Ibrahim & Omonona (2022) [23].
Gender and Social Dimensions	Lack of gender-disaggregated evidence on how rising input prices affect male- and female-headed households differently.	Input access and credit constraints are gendered, yet few studies integrate gender variables in welfare models.	Integrate gender-specific models to assess welfare elasticity of input costs among female-headed households.	Liverpool-Tasie *et al*., (2021) [28]; FAO (2021) [16].
Policy Evaluation and Impact Sustainability	Few longitudinal evaluations of major input support schemes (e.g., GESS, ABP, PFI) beyond pilot or early phases.	Most studies are cross-sectional, limiting causal inference on long-term welfare effects.	Quasi-experimental or difference-in-difference (DiD) designs to evaluate sustainability and distributional impacts of these interventions.	Abdullahi *et al*., (2021) [1]; Nkang *et al*., (2020) [36].
Climate and Market Interaction Effects	Limited integration of climatic variables (rainfall variability, temperature shocks) with input price dynamics in welfare models.	Climate shocks exacerbate input price volatility but are rarely modeled jointly.	Develop climate–input price–welfare interaction models using spatial econometric or system dynamics frameworks.	Adepoju & Oyakhilomen (2022) [3]; FAO (2021) [16].
Informal Market Dynamics	Neglect of informal input markets (local fertilizer dealers, seed exchanges) in welfare analysis.	Most analyses assume formal market participation, underestimating real price exposure.	Mixed-method or ethnographic studies to capture local price-setting behaviors and coping strategies.	Oyinbo *et al*., (2020) [44]; Ibrahim & Omonona (2022) [23].
Data Integration and Spatial Analysis	Weak integration between agricultural input market data, welfare surveys, and geospatial datasets.	Existing studies lack regional disaggregation and spatial heterogeneity.	Use of GIS-linked micro-data and price maps to identify regional disparities and policy targeting opportunities.	Nkang *et al*., (2020) [36]; Ogundari & Awokuse (2018) [37].

5. Discussion

The review consistently showed that fluctuations in farm input prices especially fertilizers, seeds, fuel, and agrochemicals have direct and indirect implications for agricultural productivity and household welfare in Nigeria and other developing countries. High input costs lead to reduced farm productivity, increased food prices, and declining rural incomes (Liverpool-Tasie *et al*., 2021; Adepoju & Oyakhilomen, 2022) [27, 3]. The review underscores the dual transmission mechanism of input price changes: through the production channel (affecting farmers' profitability) and the consumption channel (affecting household food access).

Evidence from studies such as Oyinbo *et al*., (2020) [43] and Ayanlade *et al*., (2020) [8] confirms that when input prices rise, farmers often cut back on usage, leading to yield losses, while consumers many of whom are also rural farmers face higher food expenditures. This dual effect exacerbates poverty and reduces welfare. Moreover, the burden is more severe among smallholder farmers who rely heavily on purchased inputs and lack access to credit or insurance (Ibrahim & Omonona, 2022; Ezeh *et al*., 2020) [23, 14].

From a macroeconomic perspective, input price volatility in Nigeria is often a consequence of currency depreciation, high transportation costs, and global fertilizer market disruptions (Nkang *et al*., 2020; FAO, 2021) [36, 16]. The review also shows that while several policy interventions such as the Growth Enhancement Support Scheme (GESS) and Anchor Borrowers' Programme (ABP) have aimed to stabilize input access, implementation inefficiencies and limited coverage have weakened their long-term impact (Takeshima & Liverpool-Tasie, 2015; Abdullahi *et al*., 2021) [49, 1].

Furthermore, empirical findings highlight that households adopt multiple coping strategies, including crop diversification, input substitution, informal credit access, and engagement in non-farm activities (Adetayo & Omotesho, 2021; Ibrahim & Omonona, 2022) [4, 23]. However, these adaptive responses tend to be short-term and insufficient in offsetting welfare losses when price shocks persist. Overall, the reviewed evidence converges on a key insight: input price instability remains one of the most critical but under-addressed drivers of rural poverty and food insecurity in Nigeria.

6. Conclusion

The review establishes that fluctuations in farm input prices significantly undermine agricultural productivity, food security, and household welfare in Nigeria. Persistent input cost increases constrain farmers' purchasing power, heighten rural poverty, and perpetuate inequality, particularly among smallholders and women. Sustainable policy responses by all stakeholders involved should therefore prioritize macroeconomic stability, targeted subsidies, affordable credit access, and investment in local input production and distribution infrastructure. Strengthening market integration, promoting climate-smart and low-input technologies, and enhancing data-driven monitoring systems are crucial to cushioning households against price-induced welfare shocks and ensuring the resilience of Nigeria's agricultural sector.

7. References

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